

ICESat (GLAS) Science Processing Software Document Series

Interface Control Document Between the ICESat Science Investigator-led Processing System (I-SIPS) and the National Snow and Ice Data Center (NSIDC) Version 0.1

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Foreword

This document is an Appendix to ESDIS parent document 423-41-57, *Interface Control Document Between the EOSDIS Core System (ECS) and the Science Investigator-Led Processing Systems (SIPS)*. Specifically addressed are interface controls between the ICE-Sat SIPS (I-SIPS) and the National Snow and Ice Data Center (NSIDC), in support of the GLAS instrument on the EOS ICESat (Ice, Cloud, and Land Elevation Satellite) Spacecraft.

This document will not be maintained. Any changes to the content of this ICD will be provided directly to the ESDIS parent document. Therefore, to find the latest information describing the interfaces between NSIDC and the I-SIPS the user should go to the ICD between the ECS and SIPS.

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Section 1

Introduction

This Interface Control Document is an Appendix to ESDIS parent document 423-41-57, *Interface Control Document Between the EOSDIS Core System (ECS) and the Science Investigator-Led Processing Systems (SIPS)*. It is intended that this ICD conform in all aspects to the guidelines set forth in the ESDIS parent document.

Specifically, this document provides the interface control for the exchange of files between:

- ICESat Science Investigator-led Processing System (I-SIPS) and the National Snow and Ice Data Center (NSIDC)

The I-SIPS interface with NSIDC conforms to the ECS data exchange conventions and procedures as detailed in Parent document 423-41-57.

The contents and format of the files to be exchanged are in four I-SIPS documents:

- a) *GLAS Science Data Management Plan* (Parent Document 2.1d)
- b) *GLAS Level 0 Instrument Data Product Specification* (Applicable Document 2.2b)
- c) *GLAS Standard Data Products Specification - Level 1* (Applicable Document 2.2c)
- d) *GLAS Standard Data Products Specification - Level 2* (Applicable Document 2.2d)

1.1 I-SIPS System Description

The ICESat Science Investigator-led Processing System (I-SIPS) is being established at NASA's Goddard Space Flight Center in Greenbelt, Maryland. Upon its completion, it will provide a processing system capable of producing Geoscience Laser Altimeter System (GLAS) standard products and performing product quality assessment (QA). The overall purpose of the I-SIPS is to receive the GLAS Production Data Sets from EDOS (Applicable Document 2.2f) and produce the standard data products that are provided to the NSIDC. The I-SIPS Team will make available to the NSIDC the standard data products along with associated metadata, ancillary data, and documentation.

GLAS is a nadir-pointed laser altimeter designed to measure ice sheet topography and associated temporal changes, cloud and atmospheric properties, land topography and vegetative canopy. GLAS will be flown on the Ice, Cloud, and Elevation Satellite (ICESat).

The I-SIPS operations team will use the I-SIPS Software, developed under the auspices of the GLAS Science Team (GST), to provide data products to the NSIDC. The I-SIPS design approach is predicated on the GLAS data products description and the latest GST algorithms.

I-SIPS will coordinate with the NSIDC for the developing of GLAS product-versioned Earth Science Data Types (ESDTs), necessary for the NSIDC ingestion of I-SIPS-produced data granules.

1.2 Identification of Document

This ICD is a roll-out of I-SIPS Volume 1 (the Management Volume) of the four volumes of NASA software engineering documentation. Its I-SIPS parent document is the GLAS Science Data Management Plan [Reference: Parent Document 2.1d]. Its NSIDC parent document is ESDIS document 423-41-57, Interface Control Document Between the EOSDIS Core System (ECS) and the Science Investigator-Led Processing Systems (SIPS) [Reference: Parent Document 2.1a].

Subsequent versions of this document will be uniquely identified by document version and date marks on the cover and individual page footers.

1.3 Scope of Document

The scope of this document is to control all the file exchanges between I-SIPS and NSIDC.

1.4 Purpose and Objectives of Document

The objectives of this document are: (1) to define the data to be exchanged, and (2) to describe the mechanisms/control for the file exchange interface between I-SIPS and NSIDC.

As an Appendix to ESDIS' *Interface Control Document Between the EOSDIS Core System (ECS) and the Science Investigator-Led Processing Systems (SIPS)*, this document provides information specific to the I-SIPS interface, including: a brief description of the I-SIPS and its mission, context information for the NSIDC interface, literature references, and descriptions of data types to be exchanged.

1.5 Document Organization

Sections 1 and 2 contain the introductory and reference document information. Section 3 provides an overview of the I-SIPS/NSIDC interface. Section 4 contains the framework for the data exchange, and Section 5 identifies and describes the files to be exchanged.

Supplemental information is presented in the Abbreviations and Acronyms and in the Glossary sections.

1.6 Document Status and Schedule

This document is the only release of the ICD between I-SIPS and NSIDC. Any update to information contained in this document will be provided directly to the parent document containing this information (the ICD between ECS and the SIPS).

1.6.1 Document Change History

Document Name: Interface Control Document Between the ICESat Science Investigator-led Processing System (I-SIPS) and the National Snow and Ice Data Center (NSIDC)		
Version Number	Date	Nature of Change
0.0	May 1999	Initial Document
0.1	June 1999	Updated Information

Related Documentation

This section provides the references for this I-SIPS/NSIDC interface control document. Document references include related parent documents and applicable documents.

2.1 Related Parent Documents

Parent documents are those external, higher-level documents that contribute information to the scope and content of this document. The following documents are parent to this document.

- a) *Interface Control Document Between the EOSDIS Core System (ECS) and the Science Investigator-Led Processing Systems (SIPS)*, ESDIS Document 423-41-57, December 1998, NASA Goddard Space Flight Center.
- b) *Interface Responsibilities for Standard Product Generation using Science Investigator-Led Processing Systems (SIPS)*, ESDIS Document 423-42-03, July 1998, NASA Goddard Space Flight Center.
- c) *GLAS Science Software Management Plan (GLAS SSMP)*, Version 3.0, August 1998, NASA Goddard Space Flight Center Wallops Flight Facility.
- d) *GLAS Science Data Management Plan (GLAS SDMP)*, Version 3.0, August 1998, NASA Goddard Space Flight Center Wallops Flight Facility.
- e) *GLAS Science Software Requirements Document (GLAS SSRD)*, Version 2.0, September 1998, NASA Goddard Space Flight Center Wallops Flight Facility.
- f) *NASA Earth Observing System Geoscience Laser Altimeter System GLAS Science Requirements Document*, Version 2.01, October 1997, Center for Space Research, University of Texas at Austin.

The GLAS SSMP is the top-level Volume 1 (Management Plan Volume) document of the four volumes of NASA software engineering documentation. It dictates the creation and maintenance of the Data Management Plan. This ICD is a roll out of the Data Management Plan.

2.2 Applicable Documents

Applicable documents include reference documents that are not parent documents. This category includes reference documents that have direct applicability to, or contain policies binding upon, or information directing or dictating the content of this document. The following GLAS, EOS Project, NASA, or other Agency documents are cited as applicable to this interface control document.

- a) *EOS Output Data Products, Processes, and Input Requirements*, Version 3.2, November 1995, Science Processing Support Office.

- b) *GLAS Level 0 Instrument Data Product Specification*, Version 2.2, March 17, 1998, NASA Goddard Space Flight Center Wallops Flight Facility.
- c) *GLAS Standard Data Products Specification - Level 1*, Version 2.0, December 1998, NASA Goddard Space Flight Center Wallops Flight Facility.
- d) *GLAS Standard Data Products Specification - Level 2*, Version 2.0, December 1998, NASA Goddard Space Flight Center Wallops Flight Facility.
- e) *GLAS I-SIPS Software Architectural Design Document*, Version 2.0, October 1998, NASA Goddard Space Flight Center Wallops Flight Facility.
- f) *Interface Control Document Between the Earth Observing System (EOS) Data and Operations System (EDOS) and EOS Ground System (EGS) Elements*, EDOS Document CDRL B301, June 1999, Goddard Space Flight Center.

Section 3

Interface Overview

3.1 Summary of Data Flows

Table 3-1 summarizes the data flow between I-SIPS and NSIDC that is specified in Section 5. In response to a standing order (subscription), NSIDC sends ancillary meteorological data to the I-SIPS to assist in the production of standard data and associated products.

I-SIPS, in response to standing orders, sends the Level 1 and Level 2 standard data files and associated files to NSIDC for archive. Upon request, I-SIPS will also provide to NSIDC the Level 0 GLA00 file.

In addition, I-SIPS normally will receive GLAS Production Data Sets (PDS) and GLAS Rate Buffered Data Files directly from the EOS Data and Operations Center (EDOS); concurrently, EDOS provides the PDS and the Rate Buffered Data Files to NSIDC. Upon request by I-SIPS, NSIDC will provide both data sets to I-SIPS.

Table 3-1 I-SIPS and NSIDC Interface Overview

Item No.	Source	Destination	File ID	File Name	Transfer Mechanism
1	I-SIPS	NSIDC	GLA01	Altimetry Data	FTP Pull Initiated by NSIDC
2	I-SIPS	NSIDC	GLA02	Atmosphere Data	FTP Pull Initiated by NSIDC
3	I-SIPS	NSIDC	GLA03	Engineering Data	FTP Pull Initiated by NSIDC
4	I-SIPS	NSIDC	GLA04	SRS and GPS Data	FTP Pull Initiated by NSIDC
5	I-SIPS	NSIDC	GLA05	Waveform-based Range Corrections	FTP Pull Initiated by NSIDC
6	I-SIPS	NSIDC	GLA06	Elevation	FTP Pull Initiated by NSIDC
7	I-SIPS	NSIDC	GLA07	Calibrated Backscatter	FTP Pull Initiated by NSIDC

Table 3-1 I-SIPS and NSIDC Interface Overview (Continued)

Item No.	Source	Destination	File ID	File Name	Transfer Mechanism
8	I-SIPS	NSIDC	GLA08	Boundary Layer and Elevated Aerosol Layer Heights	FTP Pull Initiated by NSIDC
9	I-SIPS	NSIDC	GLA09	Cloud Height for Multiple Layers	FTP Pull Initiated by NSIDC
10	I-SIPS	NSIDC	GLA10	Atmospheric Data Structure	FTP Pull Initiated by NSIDC
11	I-SIPS	NSIDC	GLA11	Thin Cloud/Aerosol Optical Depth	FTP Pull Initiated by NSIDC
12	I-SIPS	NSIDC	GLA12	Ice Sheet Products	FTP Pull Initiated by NSIDC
13	I-SIPS	NSIDC	GLA13	Sea Ice Products	FTP Pull Initiated by NSIDC
14	I-SIPS	NSIDC	GLA14	Land Products	FTP Pull Initiated by NSIDC
15	I-SIPS	NSIDC	GLA15	Ocean Products	FTP Pull Initiated by NSIDC
16	NSIDC	I-SIPS	GLA ANC 01	Meteorological Data File	FTP Pull Initiated by I-SIPS
17	I-SIPS	NSIDC	GLA ANC 06	GLAS Metadata and Data Product Quality File	FTP Pull Initiated by NSIDC
18	I-SIPS	NSIDC	GLA ANC 07	GLAS Coefficients and Constants ESDIS File	FTP Pull Initiated by NSIDC
19	I-SIPS	NSIDC	GLA ANC 08	Precision Orbit Data File	FTP Pull Initiated by NSIDC
20	I-SIPS	NSIDC	GLA ANC 09	Precision Attitude Data File	FTP Pull Initiated by NSIDC

Table 3-1 I-SIPS and NSIDC Interface Overview (Continued)

Item No.	Source	Destination	File ID	File Name	Transfer Mechanism
21	I-SIPS	NSIDC	N/A	Algorithm Theoretical Basis Documents	As agreed between NSIDC and I-SIPS
22	I-SIPS [Upon NSIDC Request]	NSIDC	GLA00	GLAS Instrument Packet File	FTP Pull Initiated by NSIDC
23	NSIDC [Upon I-SIPS Request]	I-SIPS	N/A	GLAS Production Data Sets	FTP Push Initiated by NSIDC
24	NSIDC [Upon I-SIPS Request]	I-SIPS	N/A	GLAS Rate Buffered Data File	FTP Push Initiated by NSIDC
25	I-SIPS	NSIDC	N/A	v0, v1, and v2 Software Deliveries	As agreed between NSIDC and I-SIPS

Section 4

Data Exchange Framework

The I-SIPS/NSIDC data exchange will adhere to the exchange framework as described in Section 4 of the parent ECS document [Interface Control Document Between the EOSDIS Core System (ECS) and the Science Investigator-Led Processing Systems (SIPS)].

Section 5

Data Flow Description

5.1 Data Provided to I-SIPS by NSIDC

5.1.1 Meteorological Data File (GLA ANC 01)

The Meteorological Data File provides the meteorological measurements from which corrections for tropospheric retardation of the laser pulses will be determined.

The initial source of this ancillary file will be the National Centers for Environmental Prediction (NCEP) of NOAA. The NCEP will make the file available to the NSIDC DAAC or, alternatively, NSIDC could obtain the file from the Goddard DAAC where the file already resides. The file contents and format description for this file are provided in Parent document 2.1d, *GLAS Science Data Management Plan*.

5.1.2 GLAS Production Data Sets

Upon I-SIPS request, NSIDC will provide the GLAS Production Data Sets (PDS) to I-SIPS. Normally, this X-Band Data will be provided directly to I-SIPS by the EOS Data and Operations System (EDOS), which will concurrently provide the file to NSIDC. NSIDC will be a backup source for the PDS if a data transmission problem with EDOS should occur.

The purpose of the PDS is to provide the initial collection of GLAS instrument and support data. Applicable document 2.2f, *Interface Control Document Between the Earth Observing System (EOS) Data and Operations System (EDOS) and EOS Ground System (EGS) Elements*, describes the data flow of the PDS, and the detailed description and format specification are contained in Applicable document 2.2f, *GLAS Level 0 Instrument Data Product Specification*.

5.1.3 GLAS Rate Buffered Data File

Upon I-SIPS request, NSIDC will provide the GLAS Rate Buffered Data File to I-SIPS. Normally, this S-Band Data will be provided directly to I-SIPS by the EOS Data and Operations System (EDOS), which will concurrently provide the file to NSIDC. NSIDC will be a backup source for the Rate Buffered Data File if a data transmission problem with EDOS should occur.

The Rate Buffered Data File contains the Level 0 S-Band housekeeping telemetry collected during each tracking pass. Applicable document 2.2f, *Interface Control Document Between the Earth Observing System (EOS) Data and Operations System (EDOS) and EOS Ground System (EGS) Elements*, describes the data flow of this file, and the detailed description and format specification are contained Applicable document 2.2f, *GLAS Level 0 Instrument Data Product Specification*.

5.1.4 Other

The NSIDC will also provide the following items (which are described in document 423-41-57):

- Subscription Acknowledgment (via e-mail)
- Distribution Notices (via e-mail)
- NSIDC Metadata Configuration File (via a TBD method)
- Product Delivery Record Discrepancy (via a TBD method)
- Production Acceptance Notification (via a TBD method)

5.1.5 Summary of Data Provided to I-SIPS by NSIDC

Table 5-1 summarizes the parameters provided by NSIDC.

Table 5-1 Summary of Data Provided by NSIDC to I-SIPS

Source File	Parameters	Elements	Application/ Destination
GLA ANC 01	Meteorological Data File	Meteorological Measurements from NCEP	Correcting Laser Pulses for Tropospheric Retardation
Production Data Sets [Upon I-SIPS Request]	GLAS Instrument and Data Packets	X-Band and S-Band Telemetry Data Collected During Each Tracking Pass	Generation of Level 0 GLA00 File

5.2 Data Provided to NSIDC by I-SIPS

5.2.1 Altimetry Data File (GLA01)

GLA01 is a Level 1A Data Product file containing altimeter height, waveform data, and other data required to produce the Level 1B waveform products. The file contents and format description for this file are provided in Applicable document 2.2e, *GLAS Standard Data Products Specification - Level 1*.

5.2.2 Atmosphere Data File (GLA02)

GLA02 is a Level 1A Data Product file containing the LIDAR data and other data to produce the Level 1B atmosphere products. The file contents and format description for this file are provided in Applicable document 2.2e, *GLAS Standard Data Products Specification - Level 1*.

5.2.3 Engineering Data File (GLA03)

GLA03 is a Level 1A Data Product file containing engineering monitor and status values converted from raw data to engineering units. The file contents and format description for this file are provided in Applicable document 2.2e, *GLAS Standard Data Products Specification - Level 1*.

5.2.4 SRS and GPS Data File (GLA04)

GLA04 is a Level 1A Data Product file containing Stellar Reference System (SRS) and Global Positioning System (GPS) data, and other instrument and spacecraft data

required to produce the precision orbit and attitude. The file contents and format description for this file are provided in Applicable document 2.2e, *GLAS Standard Data Products Specification - Level 1*.

5.2.5 Waveform-based Range Corrections (GLA05)

GLA05 is a Level 1B Data Product file containing: the range, corrections to the range from the waveform retracking algorithms, the roughness estimate, and the reflectance. The file contents and format description for this file are provided in Applicable document 2.2e, *GLAS Standard Data Products Specification - Level 1*.

5.2.6 Elevation File (GLA06)

GLA06 is a Level 1B Data Product file containing: elevations (40 hertz), elevation corrections, surface roughness, reflectance, vegetation canopy height, and associated timing and data quality information. The file contents and format description for this file are provided in Applicable document 2.2e, *GLAS Standard Data Products Specification - Level 1*.

5.2.7 Backscatter File (GLA07)

GLA07 is a Level 1B Data Product file containing the attenuated backscatter vertical profile and the associated timing and data quality information. The file contents and format description for this file are provided in Applicable document 2.2e, *GLAS Standard Data Products Specification - Level 1*.

5.2.8 Boundary Layer Height File (GLA08)

GLA08 is a Level 2 Data Product file containing the planetary boundary layer heights and the tops and bottoms of the elevated aerosol layers as derived from the aerosol structure, along with the precision orbit georeference location, timing, and quality information. The file contents and format description for this file are provided in Applicable document 2.2f, *GLAS Standard Data Products Specification - Level 2*.

5.2.9 Cloud Height for Multiple Layers File (GLA09)

GLA09 is a Level 2 Data Product file containing cloud tops and bottoms referenced to mean sea level, along with the precision orbit georeference location, timing, and quality information. The file contents and format description for this file are provided in Applicable document 2.2f, *GLAS Standard Data Products Specification - Level 2*.

5.2.10 Aerosol Vertical Structure File (GLA10)

GLA10 is a Level 2 Data Product file containing: aerosol backscatter cross section, aerosol extinction cross section, cloud backscatter cross section, and cloud absorption cross section, along with the precision orbit georeference location, timing, and quality information. The file contents and format description for this file are provided in Applicable document 2.2f, *GLAS Standard Data Products Specification - Level 2*.

5.2.11 Thin Cloud/Aerosol Optical Depth File (GLA11)

GLA11 is a Level 2 Data Product file containing planetary boundary layer, elevated aerosol, and cloud optical depth data, along with the precision orbit georeference

location, timing, and quality information. The file contents and format description for this file are provided in Applicable document 2.2f, *GLAS Standard Data Products Specification - Level 2*.

5.2.12 Ice Sheet Products File (GLA12)

GLA12 is a Level 2 Data Product file containing: corrected ice sheet elevations above the reference ellipsoid, surface roughness, reflectance, and the corrections that were used. Included are the precision orbit georeference location, timing, and quality information. The file contents and format description for this file are provided in Applicable document 2.2f, *GLAS Standard Data Products Specification - Level 2*.

5.2.13 Sea Ice Products File (GLA13)

GLA13 is a Level 2 Data Product file containing: corrected sea ice elevations above the reference ellipsoid, surface roughness, reflectance, and the corrections that were used. Included are the precision orbit georeference location, timing, and quality information. The file contents and format description for this file are provided in Applicable document 2.2f, *GLAS Standard Data Products Specification - Level 2*.

5.2.14 Land Products File (GLA14)

GLA14 is a Level 2 Data Product file containing: corrected land/canopy elevations above the reference ellipsoid, surface roughness, reflectance, and the corrections that were used. Included are the precision orbit georeference location, timing, and quality information. The file contents and format description for this file are provided in Applicable document 2.2f, *GLAS Standard Data Products Specification - Level 2*.

5.2.15 Ocean Products File (GLA15)

GLA15 is a Level 2 Data Product file containing: corrected ocean elevations above the reference ellipsoid, surface roughness, reflectance, and the corrections that were used. Included are the precision orbit georeference location, timing, and quality information. The file contents and format description for this file are provided in Applicable document 2.2f, *GLAS Standard Data Products Specification - Level 2*.

5.2.16 GLAS Metadata and Data Quality File (GLA ANC 06)

GLA ANC 06 is an ancillary file providing descriptive information about the GLAS Standard Data Products. The file contents and format description for this file are provided in Parent document 2.1d, *GLAS Science Data Management Plan*.

5.2.17 GLAS Coefficients and Constants ESDIS File (GLA ANC 07)

GLA ANC 07 is an ancillary file containing data conversion coefficients and constants for all the GLAS Science algorithms used in the processing. The file contents and format description for this file are provided in Parent document 2.1d, *GLAS Science Data Management Plan*.

5.2.18 Precision Orbit Data File (GLA ANC 08)

GLA ANC 08 is an ancillary file containing the time-referenced precision latitude, longitude, and altitude for the center-of-mass of the spacecraft. It is used for georefer-

encing the Level 1B GLAS standard data products. The file contents and format description for this file are provided in Parent document 2.1d, *GLAS Science Data Management Plan*.

5.2.19 Precision Attitude Data File (GLA ANC 09)

GLA ANC 09 is an ancillary file containing the time-ordered pointing vectors of the laser and their uncertainties. It is used to provide the off-nadir component of the laser measurement's footprint. The file contents and format description for this file are provided in Parent document 2.1d, *GLAS Science Data Management Plan*.

5.2.20 GLAS Instrument Packet File (GLA00)

Upon NSIDC request, I-SIPS will provide to NSIDC the Level 0 GLA00 . This file is created by I-SIPS using the PDS as input. GLA00 is used to generate the Level 1 data products, and is used by other processes to monitor the instrument performance and health.

5.2.21 Software Deliveries

I-SIPS will provide to NSIDC copies of the v0, v1, and v2 software deliveries, with associated documentation.

5.2.22 Other

The I-SIPS will also provide to NSIDC the following items:

- Electronic version of the ICESat (GLAS) Science Processing Software Design Reviews
- Data Subscription (via e-mail), as described in document 423-41-57
- Product Delivery Record (via a polling interface), as described in document 423-41-57
- Electronic versions of the GLAS Algorithm Theoretical Basis Documents (ATBDs)

5.2.23 Summary of Data Provided by I-SIPS to NSIDC

Table 5-2 summarizes the parameters provided by I-SIPS.

Table 5-2 Summary of GLAS Data Provided by I-SIPS to NSIDC

Source File	Parameters	Elements	Application/ Destination
GLA01	Altimetry Data	Altimeter Height, Waveform Data, and Associated Data	Input to Level 1B Elevation Computations
GLA02	Atmosphere Data	LIDAR and Associated Data	Input to Level 1B Atmosphere Computations
GLA03	Engineering Data	Engineering Monitors and Status Values	Sensor Performance Assessment

Table 5-2 Summary of GLAS Data Provided by I-SIPS to NSIDC (Continued)

Source File	Parameters	Elements	Application/ Destination
GLA04	SRS and GPS Data	SRS and GPS Data, and Associated Data	Input to Precision Orbit and Attitude Computations
GLA05	Waveform-based Range Corrections	Range, Range Corrections, Surface Roughness, and Reflectance.	Data Corrections
GLA06	Elevation Data	Elevations, Elevation Corrections, Surface Roughness, Reflectance, Vegetation Canopy Height, and Associated Data	Input to Level 2 Elevation Computations
GLA07	Calibrated Backscatter	Attenuated Backscatter Vertical Profile and Associated Data	Input to Level 2 Atmosphere Computations
GLA08	Boundary Layer and Elevated Aerosol Layer Heights	Planetary Boundary Layer Heights, Tops and Bottoms of Elevated Aerosol Layers, and Associated Data	GLAS Science Team and Science Community
GLA09	Cloud Height for Multiple Layers	Cloud Top and Bottom Heights, and Associated Data	GLAS Science Team and Science Community
GLA10	Atmospheric Data Structure	Aerosol Vertical Structure, Aerosol Backscatter Cross Section, Aerosol Extinction Cross Section, Cloud 1064nm and 532nm Backscatter Cross Section, Cloud Absorption Cross Section, and Associated Data	GLAS Science Team and Science Community
GLA11	Thin Cloud/Aerosol Optical Depth	Planetary Boundary Layer, Elevated Aerosol, Cloud Optical Depth, and Associated Data	GLAS Science Team and Science Community
GLA12	Ice Sheet Products	Ice Sheet Elevations, Surface Roughness, Reflectance, and Associated Data	GLAS Science Team and Science Community
GLA13	Sea Ice Products	Sea Ice Elevations, Surface Roughness, Reflectance, and Associated Data	GLAS Science Team and Science Community

Table 5-2 Summary of GLAS Data Provided by I-SIPS to NSIDC (Continued)

Source File	Parameters	Elements	Application/ Destination
GLA14	Land Products	Land Elevations, Surface Roughness, Reflectance, and Associated Data	GLAS Science Team and Science Community
GLA15	Ocean Products	Ocean Elevations, Surface Roughness, Reflectance, and Associated Data	GLAS Science Team and Science Community
GLA ANC 06	GLAS Metadata and Data Product Quality	Product Quality and Associated Descriptive Data	Science Data Analysis
GLA ANC 07	GLAS Coefficients and Constants	Coefficients and Constants Used During Processing	Reprocessing, If Needed
GLA ANC 08	Precision Orbit Data	Latitude, Longitude, and Altitude	Georeferencing of Products
GLA ANC 09	Precision Attitude Data	Laser Pointing Vectors	Computation of Laser Footprint Location
GLA00 [Upon NSIDC Request]	GLAS Instrument Packet File	Instrument Telemetry and Instrument Support Data	Generation of Level 1A Products
TBD	v0, v1, and v2 Software Deliveries	Software and Associated Documentation	Software Archive
TBD	Algorithm Theoretical Basis Documents	Descriptions of mathematical data transformations	Data Analysis by Science Community

Abbreviations & Acronyms

ALT	designation for the EOS-Altimeter spacecraft series
DAAC	Distributed Active Archive Center
EDOS	EOS Data and Operations System
EOC	EOS Operating Center
EOS	NASA Earth Observing System Mission Program
EOSDIS	Earth Observing System Data and Information System
ESDT	Earth Science Data Type
GLAS	Geoscience Laser Altimeter System instrument or investigation
GPS	Global Positioning System
GSFC	NASA Goddard Space Flight Center at Greenbelt, Maryland
GSFC/WFF	NASA Goddard Space Flight Center/Wallops Flight Facility at Wallops Island, Virginia
GST	GLAS Science Team
ICESat	Ice, Cloud, and Land Elevation Satellite
I-SIPS	ICESat Science Investigator-led Processing System
IST	GLAS Instrument Support Terminal
LASER	Light Amplification by Stimulated Emission of Radiation
LIDAR	Light Detection and Ranging
N/A	Not (/) Applicable
NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
NSIDC	National Snow and Ice Data Center
PDS	Production Data Set
SCF	GLAS investigation Science Computing Facility and workstation(s)
SIPS	Science Investigator-led Processing System
TBD	to be determined, to be done, or to be developed

Glossary

file	A collection of data stored as records and terminated by a physical or logical end-of-file (EOF) marker. The term usually applies to the collection within a storage device or storage media such as a disk file or a tape file. Loosely employed it is used to indicate a collection of GLAS data records without a standard label. For the Level 1A Data Product, the file would constitute the collection of one-second Level 1A data records generated in the SDPS working storage for a single pass.
header	A text and/or binary label or information record, record set, or block, prefacing a data record, record set, or a file. A header usually contains identifying or descriptive information, and may sometimes be embedded within a record rather than attached as a prefix.
item	Specifically, a data item. A discrete, non-decomposable unit of data, usually a single word or value in a data record, or a single value from a data array. The representation of a single GLAS data value within a data array or a GLAS Data Element.
label	The text and/or binary information records, record set, block, header, or headers prefacing a data file or linked to a data file sufficient to form a labeled data product. A standard label may imply a standard data product. A label may consist of a single header as well as multiple headers and markers depending on the defining authority.
Level 0	The level designation applied to an EOS data product that consists of raw instrument data, recorded at the original resolution, in time order, with any duplicate or redundant data packets removed.
Level 1A	The level designation applied to an EOS data product that consists of reconstructed, unprocessed Level 0 instrument data, recorded at the full resolution with time referenced data records, in time order. The data are annotated with ancillary information including radiometric and geometric calibration coefficients, and georeferencing parameter data (i.e., ephemeris data). The included, computed coefficients and parameter data have not however been applied to correct the Level 0 instrument data contents.
Level 1B	The level designation applied to an EOS data product that consists of Level 1A data that have been radiometrically corrected, processed from raw data into sensor data units, and have been geolocated according to applied georeferencing data.
Level 2	The level designation applied to an EOS data product that consists of derived geophysical data values, recorded at the same resolution, time order, and georeference location as the Level 1A or Level 1B data.
Level 3	The level designation applied to an EOS data product that consists of geophysical data values derived from Level 1 or Level 2 data, recorded at a temporally or spatially resampled resolution.
Level 4	The level designation applied to an EOS data product that consists of data from modeled output or resultant analysis of lower level data that are not directly derived by the GLAS instrument and supplemental sensors.

metadata	The textual information supplied as supplemental, descriptive information to a data product. It may consist of fixed or variable length records of ASCII data describing files, records, parameters, elements, items, formats, etc., that may serve as catalog, data base, keyword/value, header, or label data. This data may be parsable and searchable by some tool or utility program.
orbit	The passage of time and spacecraft travel signifying a complete journey around a celestial or terrestrial body. For GLAS and the EOS ALT-L spacecraft each orbit starts at the time when the spacecraft is on the equator traveling toward the North Pole, continues through the equator crossing as the spacecraft ground track moves toward the South Pole, and terminates when the spacecraft has reached the equator moving northward from the South Polar region.
parameter	Specifically, an EOS Data Parameter. This is a defining, controlling, or constraining data unit associated with a EOS science community approved algorithm. It is identified by an EOS Parameter Number and Parameter Name. An EOS Data Parameter within the GLAS Data Product is composed of one or more GLAS Data Elements
pass	A sub-segment of an orbit, it may consist of the ascending or descending portion of an orbit (e.g., a descending pass would consist of the ground track segment beginning with the northernmost point of travel through the following southernmost point of travel), or the segment above or below the equator; for GLAS the pass is identified as either the northern or southern hemisphere portion of the ground track on any orbit
product	Specifically, the Data Product or the EOS Data Product. This is implicitly the labeled data product or the data product as produced by software on the SDPS or SCF. A GLAS data product refers to the data file or record collection either prefaced with a product label or standard formatted data label or linked to a product label or standard formatted data label file. Loosely used, it may indicate a single pass file aggregation, or the entire set of product files contained in a data repository.
record	A specific organization or aggregate of data items. It represents the collection of EOS Data Parameters within a given time interval, such as a one-second data record. It is the first level decomposition of a product file.
Standard Data Product	Specifically, a GLAS Standard Data Product. It represents an EOS ALT-L/ GLAS Data Product produced on the EOSDIS SDPS for GLAS data product generation or within the GLAS Science Computing Facility using EOS science community approved algorithms. It is routinely produced and is intended to be archived in the EOSDIS data repository for EOS user community-wide access and retrieval.
variable	Usually a reference in a computer program to a storage location, i.e., a place to contain or hold the value of a data item.